

## What is Claimed is:

- [c1] A method for optimizing leaf comparisons from a tree search of data stored in external memory of an embedded processing system, the method comprising:
  - providing a control structure for leaf data comparisons as a control vector and a match key; and
  - utilizing the control vector to direct types of comparison tests performed with the match key.
- [c2] The method of claim 1 wherein the control vector further comprises a control setting for a chosen portion of the match key.
- [c3] The method of claim 2 wherein the control setting further comprises a two-bit value.
- [c4] The method of claim 2 further comprising providing the control structure in a fixed size block of memory.
- [c5] The method of claim 4 further comprising allowing storage of additional data in the fixed size block of memory following the control structure.
- [c6] The method of claim 2 wherein the control vector further comprises a control setting to indicate a masked compare test is needed.
- [c7] The method of claim 6 wherein the match key further comprises a mask pattern and key value for the masked compare test.
- [c8] The method of claim 2 wherein the control vector further comprises a control setting to indicate a range compare test is needed.
- [c9] The method of claim 8 wherein the match key further comprises maximum and minimum values of a range for the range compare test.
- [c10] An embedded processing system for optimizing leaf comparisons from a tree search, the embedded processing system comprising:
  - an embedded processor, the embedded processor including a tree search engine; and
  - external memory coupled to the embedded processor, wherein the tree

search engine performs comparisons on leaf data in the external memory according to a control structure comprising a control vector and match key in the leaf data.

[c11] The embedded processing system of claim 10 wherein the control vector further comprises a control setting for a chosen portion of the match key.

[c12] The embedded processing system of claim 11 wherein the control setting further comprises a two-bit value.

[c13] The embedded processing system of claim 10 wherein the external memory comprises fixed sized blocks for storing the control structure.

[c14] The embedded processing system of claim 13 wherein the external memory further stores additional data in the fixed size block of memory following the control structure.

[c15] The embedded processing system of claim 11 wherein the control vector further comprises a control setting to indicate a masked compare test is needed.

[c16] The embedded processing system of claim 15 wherein the match key further comprises a mask pattern and key value for the masked compare test.

[c17] The embedded processing system of claim 11 wherein the control vector further comprises a control setting to indicate a range compare test is needed.

[c18] The embedded processing system of claim 17 wherein the match key further comprises maximum and minimum values of a range for the range compare test.

[c19] A method for optimizing leaf comparisons of a tree search, the method comprising:

storing leaf data of a tree structure in external DRAM of an embedded processing system;  
organizing the leaf data within fixed size blocks of memory in the external DRAM as a control vector and match key; and  
utilizing the control vector and match key to direct comparisons done on

the leaf data by a tree search engine of the embedded processing system.

- [c20] The method of claim 19 wherein the control vector further comprises a control setting for a chosen portion of the match key.
- [c21] The method of claim 20 wherein the control setting further comprises a two-bit value.
- [c22] The method of claim 20 wherein the control vector further comprises a control setting to indicate a masked compare test is needed.
- [c23] The method of claim 22 wherein the match key further comprises a mask pattern and key value for the masked compare test.
- [c24] The method of claim 20 wherein the control vector further comprises a control setting to indicate a range compare test is needed.
- [c25] The method of claim 24 wherein the match key further comprises maximum and minimum values of a range for the range compare test.
- [c26] A computer readable medium containing program instructions for optimizing leaf comparisons from a tree search of data stored in external memory of an embedded processing system, the program instructions comprising:
- providing a control structure for leaf data comparisons as a control vector and a match key; and
  - utilizing the control vector to direct types of comparison tests performed with the match key.
- [c27] A computer readable medium containing program instructions for optimizing leaf comparisons of a tree search, the program instructions comprising:
- storing leaf data of a tree structure in external DRAM of an embedded processing system;
  - organizing the leaf data within fixed size blocks of memory in the external DRAM as a control vector and match key; and
  - utilizing the control vector and match key to direct comparisons done on the leaf data by a tree search engine of the embedded processing system.